

SUMO

Suggested Upper Merged
Ontology in brief

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Upper Ontology

- An attempt to capture the **most general** and **reusable terms** and definitions
- Provokes thought on **clarifying the meaning** of more specific terms => philosophers
- Provides for large-scale **reuse**
- Foundation ontology for a variety of computer **information processing systems**

Googling for SUMO ;-)

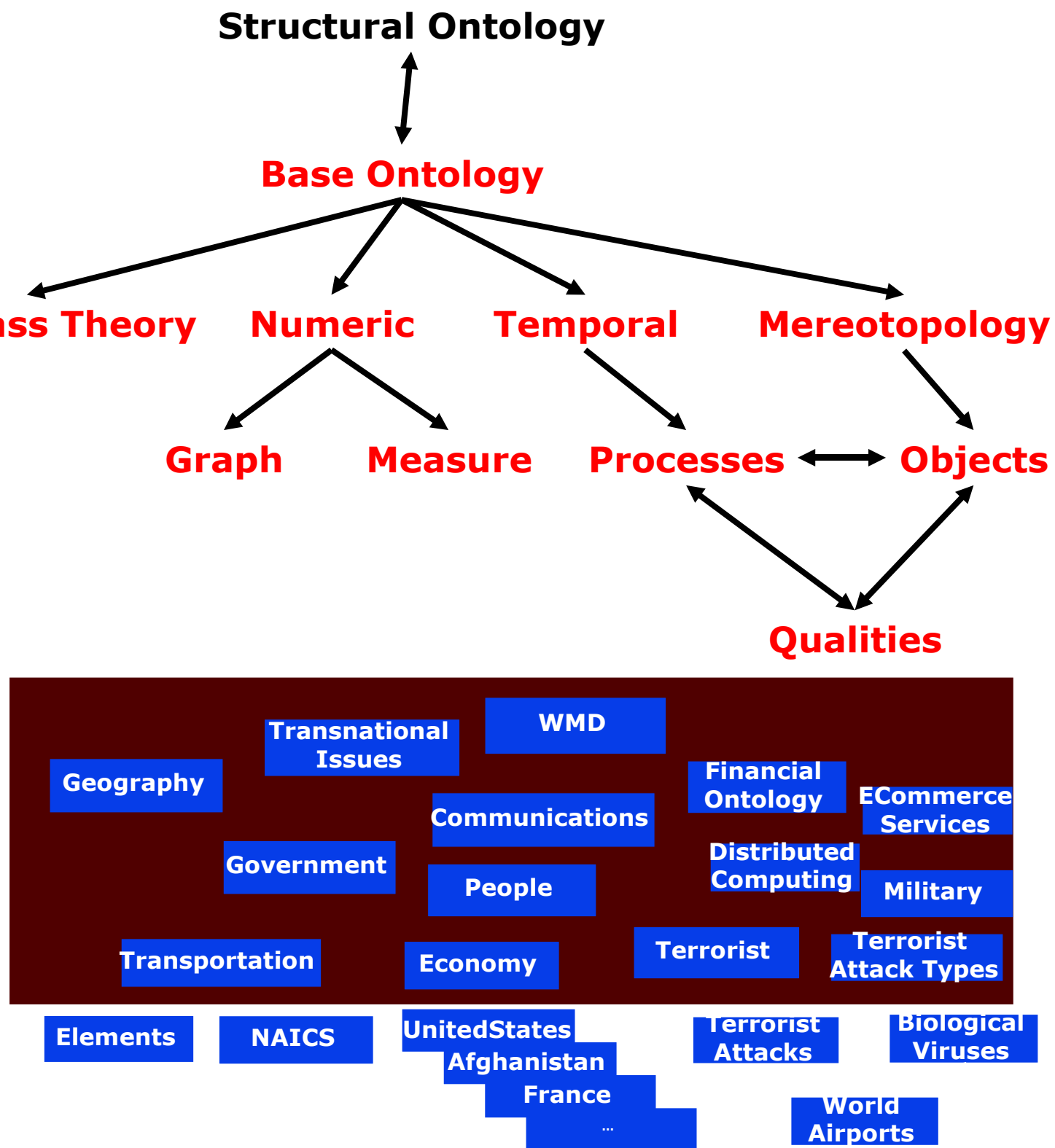
SUMO



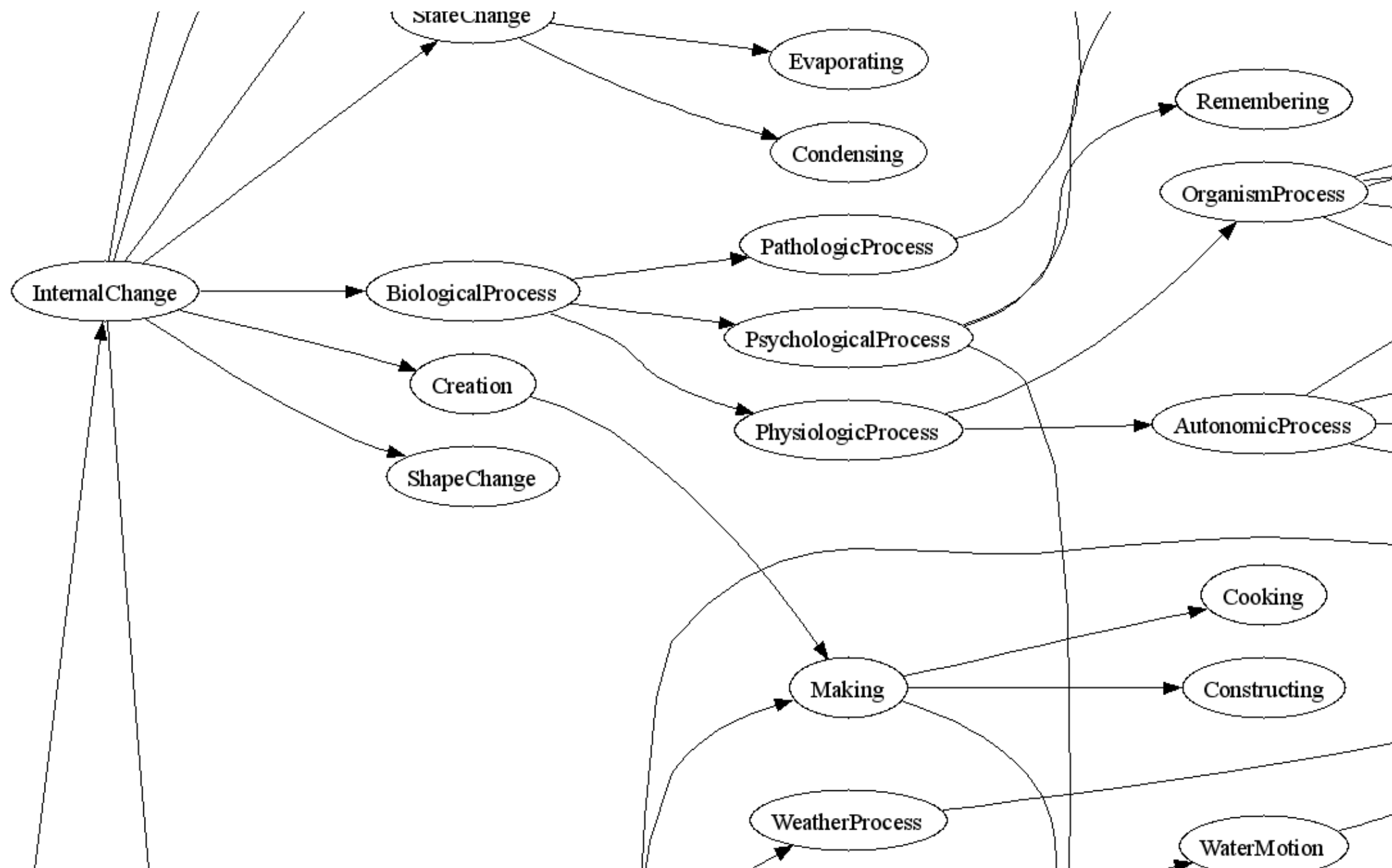
(相撲 , *sumō*?) is a competitive contact sport where two wrestlers (*rikishi*) attempt to force one another out of a circular ring (*dohyo*) or to touch the ground with anything other than the soles of the feet.

*originally
upper
ontology
with
meta-level concepts*

*...expanded
to include
mid-level
ontologies
...and
dozens of
domain
ontologies*



Excerpt of SUMO classes graph



Suggested Upper Merged Ontology

- Formal ontology stated in first-order logic (KIF)
- 1000 **terms**:
 - e.g. plant: *a living organism lacking the power of locomotion*
- 4000 **axioms**:
 - e.g. explain formally what a plant is:

```
(=>  
  (and  
    (instance ?SUBSTANCE PlantSubstance)  
    (instance ?PLANT Organism)  
    (part ?SUBSTANCE ?PLANT))  
    (instance ?PLANT Plant))
```

Suggested Upper Merged Ontology

- 750 rules:
 - e.g. *“If there's an instance of Driving, there's a Vehicle that participates in that action.”*
 - Not just an English definition for humans to read, but a logical definition that can be used in proofs.

(=>

```
(instance ?DRIVE Driving)
(exists (?VEHICLE)
  (and
    (instance ?VEHICLE Vehicle)
    (patient ?DRIVE ?VEHICLE))))
```

Lexical interoperability

- **WordNet** – free international lexicon:
 - ~100 WordNets all over the world in different languages, related one to each other
- SUMO – mapped by hand to all of WordNet
 - e.g. most *nouns* map to classes
 - **translation** of SUMO paraphrases to diverse multiple languages, e.g. Chinese, Italian, e.g.

```
(termFormat it Blood "Sangue")  
(termFormat it Entity "Entita")  
(termFormat it Physical "EntitaConcreta")  
(termFormat it Object "Oggetto")  
(termFormat it SelfConnectedObject "OggettoIntegro")  
(termFormat it Substance "Sostanza")  
(termFormat it PureSubstance "SostanzaPura")  
(termFormat it ElementalSubstance "SostanzaElementare")
```


Use and Extend It Yourself

- It can be downloaded and used freely:
 - SUMO – public domain, domain ontologies – GNU
- You can browse it on-line:
 - <http://www.ontologyportal.org>
- You can extend SUMO ontology with your own domain ontology and make inference:
 - SIGMA, open source tool:
<http://sigmakee.sourceforge.net>
- Many academic and commercial uses
 - <http://www.ontologyportal.org/Pubs.html>
 - e.g. *Controlled English to Logic Translation*